

Remarks

Applicants have amended claims 2, 15, 25, 26, 34, 36, 43, 48-50, 53, 54, 57, 61 and 63-65 and have added new claims 77 and 78. Among other amendments, Applicants have amended each pending independent claim (2, 15, 25, 26, 34, 50 and 65) and new independent claim 77 to recite that the primary waste pond (claims 2 and 15), the inner pond (claims 25, 26 and 65), the methane fermentation zone (claim 34), and the fermentation pit (claims 50 and 77) each have a bottom that is at least 6 meters below the top surface of the pond. Support for this limitation is provided in several places throughout the specification, including, for example, page 10, lines 27-29.

Independent claims 2, 15 and 26 have also been amended to include a limitation that the primary waste pond (claims 2 and 15) and the inner pond (claim 26) are at least partially constructed from earthwork. Support for this limitation may be found, for example, at page 12, lines 16-20. New claim 78 recites a dimension for the wall that deflects oxygen; support for which may be found at page 9, lines 10-12.

Independent claim 25 and dependent claims 43, 57 and 73 have been amended to recite the gaseous emission as comprising 70-85% methane and the balance mostly nitrogen to distinguish the gaseous emission composition from conventional digesters that typically generate about 60% methane and about 30% carbon dioxide. Support for this limitation may be found, for example, at page 5, lines 25-30.

Dependent claims 48, 61 and 63 have been amended to recite that the oxidation of hydrogen sulfide to form sulfates reduces noxious odors, which is a significant discovery and advantage of the present invention. Support for this limitation may be found, for example, at page 2, lines 17-20.

Dependent claims 49 and 64 have been amended to recite that the wastewater flows in an upward direction at a rate of less than 1.8 meters per day. Support for this limitation may be found, for example, at page 11, lines 27-31.

The Examiner's rejections are addressed below in the order in which they were presented.

U.S. Patent No. 4,997,568

The Examiner has rejected independent claims 2 and 34 under 35 U.S.C. § 102(b) as being anticipated by the '568 patent. Applicants respectfully traverse this rejection particularly in light of the amendments to the claims.

The '568 patent describes a conic chamber filled with various filter media. While it is difficult to conceive of such a chamber as a pond, assuming *arguendo* that such could be construed as a pond, the top sand layer (referred to by the Examiner as the outer pond) does not overlay *and* surround "at least an upper lateral portion" of the lower filter media layers (referred to by the Examiner as the inner pond). The top sand layer is disposed only on the top of the lower filter media layers. Therefore, the '568 patent does not teach or suggest an outer pond that overlays and surrounds at least an upper lateral portion of a primary waste pond as recited in claim 2. Further, the '568 patent does not teach or suggest a methane fermentation zone that is at least partially laterally surrounded by a pond as recited in claim 34. Therefore, withdrawal of this rejection is respectfully requested.

Further, it is not believed that the '568 patent teaches or suggests the production of a gaseous emission comprising about 70-85% methane and the balance mostly nitrogen as recited in claim 43, which is dependent from claim 34.

In addition, the '568 patent does not teach or suggest a fermentation pit that has a bottom that is at least 6 meters from a top surface of said outer pond as recited in new claim 77 nor deflecting dissolved oxygen in said outer pond from said fermentation pit with a wall vertically surrounding said fermentation pit, wherein said wall has a height of approximately 2.5 meters from the bottom surface of said outer pond adjacent to said fermentation pit as recited in new claim 78.

U.S. Patent No. 6,203,702

The Examiner has rejected independent claims 2 and 34 under 35 U.S.C. § 102(e) as being anticipated by the '702 patent. Applicants respectfully traverse this rejection, particularly in light of the amendments to the claims.

The '702 patent describes an aerobic zone that is on top of an anaerobic zone. Basically, the cell 22 simply contains two stratified layers and does not teach or suggest the formation of a primary waste pond within an outer pond. The aerobic zone does not overlay *and* surround "at least an upper lateral portion" of the anaerobic zone. The top aerobic zone is disposed only on the top of the anaerobic zone. Therefore, the '702 patent does not teach

or suggest an outer pond that overlays and surrounds at least an upper lateral portion of a primary waste pond as recited in claim 2. Further, the '702 patent does not teach or suggest a methane fermentation zone that is at least partially laterally surrounded by a pond as recited in claim 34.

Moreover, it is suspect whether the '702 patent does provide an anaerobic zone since the introduction of air, and, therefore, dissolved oxygen, immediately above the "anaerobic zone" would result in the diffusion of dissolved oxygen into this zone, which prohibits anaerobic digestion and methane fermentation. Therefore, withdrawal of this rejection is respectfully requested.

Further, it is not believed that the '702 patent teaches or suggests the production of a gaseous emission comprising about 70-85% methane and the balance mostly nitrogen as recited in claim 43, which is dependent from claim 34.

In addition, the '702 patent does not teach or suggest a fermentation pit that has a bottom that is at least 6 meters from a top surface of said outer pond as recited in new claim 77 nor deflecting dissolved oxygen in said outer pond from said fermentation pit with a wall vertically surrounding said fermentation pit, wherein said wall has a height of approximately 2.5 meters from the bottom surface of said outer pond adjacent to said fermentation pit as recited in new claim 78.

U.S. Patent No. 5,616,241

The Examiner has rejected independent claims 2, 15 and 26 under 35 U.S.C. § 102(b) as being anticipated by the '241 patent. Applicants respectfully traverse this rejection, particularly in light of the amendments to the claims.

The '241 patent, in particular FIGS. 8 and 14 describe a combined anaerobic reactor and sludge conditioner. Such is not a pond and the anaerobic reactor is not at least partially constructed from earthwork. Claim 2 and 15 recites that the primary waste pond is at least partially constructed from earthwork. Similarly, claim 26 also recites that the inner pond is at least partially constructed from earthwork. Therefore, the '241 patent does not teach or suggest such an earthwork construction and withdrawal of this rejection is respectfully requested.

The Examiner has also rejected claim 16 (dependent from claim 15) under 35 U.S.C. § 103(a) as being obvious over the '241 patent in light of U.S. Patent No. 5,500,306. In light of the argument above with respect to independent claim 15, the deficiencies of the

'241 patent are not taught or suggested by the '306 patent. Therefore, withdrawal of this rejection is respectfully requested.

In addition, the '306 patent does not teach or suggest a fermentation pit that has a bottom that is at least 6 meters from a top surface of said outer pond as recited in new claim 77 nor deflecting dissolved oxygen in said outer pond from said fermentation pit with a wall vertically surrounding said fermentation pit, wherein said wall has a height of approximately 2.5 meters from the bottom surface of said outer pond adjacent to said fermentation pit as recited in new claim 78.

U.S. Patent No. 5,599,451

The Examiner has rejected independent claims 2 and 34 under 35 U.S.C. § 102(b) as being anticipated by the '451 patent. Applicants respectfully traverse this rejection, particularly in light of the amendments to the claims.

The '451 patent describes a bioreactor for treating waste liquids, such as pulp and paper waste water. While it is difficult to conceive of the bioreactor shown in the '415 patent as a pond, assuming *arguendo* that such could be construed as a pond, the '415 patent does not teach or suggest a primary waste pond at least partially constructed of earthwork as recited and having a bottom that is at least 6 meters below the surface of an outer pond as recited in claim 2. Further, the '415 patent does not teach or suggest a methane fermentation zone within a pond that has a surface exposed to sunlight or, again, a methane fermentation zone having a bottom that is at least 6 meters below the surface of the pond as recited in claim 34. Therefore, the '415 patent does not teach or suggest each of the limitations of these claims as amended and withdrawal of this rejection is respectfully requested.

Further, it is not believed that the '451 patent teaches or suggests the production of a gaseous emission comprising about 70-85% methane and the balance mostly nitrogen as recited in claim 43, which is dependent from claim 34.

In addition, the '415 patent does not teach or suggest a fermentation pit that has a bottom that is at least 6 meters from a top surface of said outer pond as recited in new claim 77 nor deflecting dissolved oxygen in said outer pond from said fermentation pit with a wall vertically surrounding said fermentation pit, wherein said wall has a height of approximately 2.5 meters from the bottom surface of said outer pond adjacent to said fermentation pit as recited in new claim 78.

Energetics of Advanced Integrated Wastewater Pond Systems

The Examiner has rejected claims 2, 15, 16, 25-27 and 34-76 under 35 U.S.C. § 102(b) as being anticipated by this technical paper ("Green"). Applicants respectfully traverse this rejection, particularly in light of the amendments to the claims.

Green reports on testing at a pilot facility in Richmond, California. This facility included a 0.1 hectare advanced facultative pond having an in-pond digester. This in-pond digester, however, had a bottom that was only 4.8 meters below the top surface of the pond (see page 11 and Fig. 2) and a rim wall surrounding the in-pond digester of only 1 meter in height.

Since this testing, the inventors have discovered that the depth of the inner pond is significantly important in its operation. As discussed in the specification, having a inner pit bottom of at least 6 meters has been discovered to provide sufficient pressure to compress settleable solids within the inner pond to, thereby, increase their density and rate of sedimentation and to impede their upflow. Moreover, such depth provides for more stable anaerobic digestion and methane fermentation since there is little or no diffused oxygen at the lower depth. In particular, the specification describes a preferred embodiment in which the fermentation zone or inner pond should be 6 to 8 or more meters in depth (see page 10, lines 27-29). Therefore, pending independent claims 2, 15, 25, 26, 34, 50 and 65 recite that the primary waste pond (claims 2 and 15), the inner pond (claims 25, 26 and 65), the methane fermentation zone (claim 34), and the fermentation pit (claim 50) each have a bottom that is at least 6 meters below the top surface of the pond. Green does not teach or suggest any information regarding the importance of the depth of the inner pond and certainly does not teach or suggest a limitation of this depth being at least 6 meters. Therefore, Green does not teach or suggest each and every limitation of these pending independent claims and withdrawal of this rejection is respectfully requested.

In addition, Green does not teach or suggest a fermentation pit that has a bottom that is at least 6 meters from a top surface of said outer pond as recited in new claim 77 nor deflecting dissolved oxygen in said outer pond from said fermentation pit with a wall vertically surrounding said fermentation pit, wherein said wall has a height of approximately 2.5 meters from the bottom surface of said outer pond adjacent to said fermentation pit as recited in new claim 78.

Rejection of Claim 25

The Examiner has rejection claim 25 under 35 U.S.C. § 102(b) as being anticipated by either the '568 patent, the '702 patent, the '241 patent, the '451 patent or the Green publication. Applicants respectfully traverse this rejection, particularly in light of the amendments to the claims. As stated above in connection with the rejection under Green, each of the independent claims now recites that the primary waste pond (claims 2 and 15), the inner pond (claims 25, 26 and 65), the methane fermentation zone (claim 34), and the fermentation pit (claims 50 and 77) each have a bottom that is at least 6 meters below the top surface of the pond. None of the cited references teach or suggest such a depth. Therefore, withdrawal of this rejection is respectfully requested.

Rejection of Claim 27

The Examiner has rejection claim 27 (dependent from independent claim 26) under 35 U.S.C. § 103(a) as unpatentable over the '568 patent and U.S. Patent No. 5,782,950; the '702 patent and the '950 patent; the '241 patent and the '950 patent; the '451 patent and the '950 patent; or the Green publication and the '950 patent. Applicants respectfully traverse this rejection, particularly in light of the amendments to the claims. As stated above in connection with the rejection under Green, independent claim 26 now recites that the inner pond has a bottom that is at least 6 meters below the top surface of the pond. The '950 patent does not cure the deficiencies of the other cited art. Therefore, withdrawal of this rejection is respectfully requested.

Rejections Under 35 U.S.C. § 112, 2nd Paragraph

The Examiner has rejected claims 34-49 and 65-76 under 35 U.S.C. § 112, 2nd paragraph, for failing to particularly point out and distinctly claim the subject matter for which patent protection is sought. Specifically, the Examiner contends that it is unclear what "substantially open surface" means. Although Applicants believe this term is clear, to expedite prosecution, Applicants have amended independent claims 34 and 65 to delete these words and to amend independent claims 34 and 65 to recite that the pond has a surface that is exposed to sunlight. Support for this limitation may be found, for example, at page 4, lines 5-9. Applicants believe that this amendment obviates this rejection and respectfully request withdrawal of this rejection.

Information Disclosure Statements

Applicants note that the Examiner has only initialed one 1449 form in this case. However, Applicants have submitted four 1449 forms. Applicants respectfully request the return of the three remaining 1449 forms in initialed form.

Conclusion

In view of the above, Applicants respectfully request a timely Notice of Allowance in this application. The Examiner is invited to call the undersigned attorney if a telephone call could help resolve any remaining items.

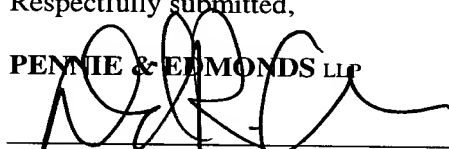
Applicants believe that no fee is due with this submission. However, if it is determined that a fee is due, please charge the required fee to Pennie & Edmonds LLP Deposit Account No. 16-1150. A copy of this sheet is enclosed.

Respectfully submitted,

PENNIE & EDMONDS LLP

Date: May 27, 2003

By:


David R. Owens
For Gary S. Williams

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Reg. No.
31,066